

Original Research Article

Maternal mortality and morbidity amongst antenatal patients with and without COVID-19 infection

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Received: 07 May 2023

Revised: 07 June 2023

Accepted: 13 June 2023

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ABSTRACT

Background: The aim of our study is to compare the maternal mortality between those who are infected with COVID-19 infection and those who are not. Our study was done at Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, which included 2 groups: group 1- pregnant women with COVID-19 infection, and group 2- pregnant women without COVID-19 infection.

Methods: Our study is prospective and comparative study, done over 250 antenatal patients admitted at our centre, with COVID-19 infection status confirmed either by rapid antigen testing, or by reverse transcription polymerase chain reaction (RT-PCR)/TruNaat testing who had signs and symptoms of COVID-19 infection along with those who needed obstetric intervention or had a high-risk pregnancy status.

Results: Preterm labor accounted for the maternal complication with a majority in COVID-19 infected maternal group. Maternal mortality did not increase amongst patients affected with COVID-19 infection within our study duration.

Conclusions: Maternal mortality thus did not seem to be affected much by the COVID-19 pandemic probably due to the low infectivity and fatality of third wave was low.

Keywords: COVID-19 pandemic impact, Maternal mortality, Antenatal patients, TruNaat testing, Pregnancy and COVID

INTRODUCTION

The COVID-19 virus, which is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, mostly affects our respiratory system. In comparison to the third wave of the COVID-19 pandemic, which did not contribute significantly to the overall fatality rate, the first and second waves of the pandemic were highly contagious and lethal.¹ People with co-morbid illness are at an increased risk of contracting the virus. Infection with the COVID-19 virus is more likely to occur in women who are pregnant. We are making ongoing efforts to lessen the toll that the current epidemic takes in terms of maternal morbidity and mortality. The death rate among mothers is of the utmost importance. The rapid development of the

COVID-19 pandemic is a further obstacle for us to overcome as we work to restore order to the shattered maternal care system. Constant and ongoing research and studies have not yet been able to discover the uncharted dark corners of the impact that COVID-19 infection has on our health system.² Our research will play an important role in illuminating these shadowy areas and assisting us in developing more effective health care policies, particularly with regard to the maternal population.

METHODS

The Maharani Laxmi Bai Medical College in Jhansi will play host to our prospective and comparative research project between the months of July 2021 and April 2022.

The research period fell during the third wave of the COVID-19 epidemic that was going around. For the purpose of making a comparison, we split the participants into two groups: group 1 consisted of pregnant women who had been diagnosed with COVID-19, and group 2 was comprised up of pregnant women who did not have COVID-19 infection. The selection criteria incorporated pregnant women who were either admitted to the hospital or referred to us as COVID-19 positive, with an overall prevalence of the virus being 13.1% in our area (CI=95%). An additional 10% of cases were included to account for potential loss to follow-up.

Each participant's age, parity, gestational age, delivery mode and outcome, as well as details regarding ICU admission and stay duration were meticulously recorded. We compared maternal complications between the two groups, considering variables such as "preterm labor, antepartum hemorrhage, pregnancy-induced hypertension, pre-eclampsia/eclampsia, prelabor rupture of membranes, fetal distress, and infections requiring antibiotics." All admitted patients underwent COVID-19 testing, with those testing positive being placed in isolation wards. In cases where the rapid antigen test result was negative, confirmation was obtained through RT-PCR or TruNaat testing. The severity of COVID-19 infection was classified according to the "clinical guidance for management of adult COVID-19 patients provided by the Ministry of Health and Family Welfare, Government of India".

Regarding ethical considerations, all aspects of our study involving human patients were conducted with full ethical approval from the relevant authorities.

All participants provided informed consent, and the research adhered to principles of confidentiality and respect for participant rights.

Statistical package for the social sciences (SPSS) v27.0 was used for our statistical analysis. Data with a normal distribution were designated as mean ($\pm$ SD), while data with a skewed distribution were denoted as median (inter quartile range). Due to the limited sample size, categorical variables were reported as percentages, and Fisher's exact test was utilised for hypothesis testing to analyse proportional differences across groups. The statistical significance level was chosen at $p < 0.05$.

RESULTS

Our study included 250 prenatal patients, 125 of them were COVID-19 positive and the rest were negative. Maternal mortality was lower in the COVID-19-infected group ($n=10/125$; 8%) than in the non-infected group ($n=12/125$; 9.6%). As a result, our findings indicate that maternal mortality among prenatal patients infected with COVID-19 did not rise considerably. The study also discovered that COVID-19-infected mothers were more likely to have preterm labour and other pregnancy-related problems.

In a nutshell COVID-19 infection in prenatal women is not related with an increased risk of maternal mortality, but morbidities such as premature labour have increased, potentially leading to an increase in the number of preterm neonates.

Table 1: Demographic characteristics.

Characteristics	COVID-19 positive antenatal patients (n=125)	COVID-19 negative antenatal patients (n=125)
Age (years) (mean$\pm$SD)	27 $\pm$ 4	28 $\pm$ 2
P value	<0.0466	<0.0466
Parity (%)		
Primigravida	45 (36.0)	50 (40.0)
Multigravida	80 (64.0)	75 (60.0)
P value	<0.5147	<0.5147
Gestational age in mean (weeks)	37.9 $\pm$ 3.3	38.5 $\pm$ 3.1
P value	<0.1397	<0.1397

Table 2: Presenting symptoms.

Symptoms	No. of cases	Percentage
Number of patients diagnosed with COVID-19	125	100.0
Asymptomatic	77	61.6
Symptomatic	48	38.4
URTI with dyspnoea	25	32.4
URTI without dyspnoea	35	46.6
Other (GI/anosmia)	17	22.6

Table 3: Maternal complications/outcome.

Complications	COVID-19 positive antenatal patients, No. (%) (n=125)	COVID-19 negative antenatal patients No. (%) (n=125)
Antepartum haemorrhage	14 (11.2)	12 (9.6)
Pregnancy-induced hypertension	16 (12.8)	20 (16)
Preeclampsia/eclampsia	12 (9.6)	18 (14.4)
Prelabor rupture of membranes	12 (9.6)	8 (6.4)
Fetal distress	13 (10.4)	10 (8.0)
Preterm labor	25 (20.0)	18 (14.4)

Continued.

Complications	COVID-19 positive antenatal patients, No. (%) (n=125)	COVID-19 negative antenatal patients No. (%) (n=125)
Infections requiring antibiotics	10 (8.0)	5 (4.0)
Admitted to ICU	20 (16.0)	2 (1.6)
P value	<0.0001	<0.0001
Time in ICU (in mean) days	8	2
P value	<0.0001	<0.0001
Maternal death	10 (8)	12 (9.6)
P value	<0.00001	<0.00001
Spontaneous initiation of labour	8 (6.4)	9 (7.20)
Caesarean delivery	75 (48.0)	50 (40.0)
P value	<0.0001	<0.0001

DISCUSSION

Our study, which included 250 prenatal patients, half of whom tested positive for COVID-19 and the rest of whom tested negative, investigated the possible influence of COVID-19 on maternal mortality and morbidity. Interestingly, our findings reveal that parameters such as age, parity, gestational age, and place of residency had no effect on mortality and morbidity in COVID-19 infected prenatal patients versus non-infected antenatal patients. The exception was senior age, which modestly increased the probability of developing COVID-19, probably due to an increase in co-morbidities that made persons more susceptible to infection.

Although the overall mortality rate among COVID-19 positive prenatal patients was low, we did find a significant influence on maternal morbidity. The COVID-19 pandemic was found to have reduced prenatal examinations due to fear of exposure, potentially contributing to an increase in maternal morbidity. While the majority of patients with a positive COVID-19 status had respiratory distress symptoms, COVID-19 infected individuals were admitted to the ICU more frequently and for a longer period of time. Other typical symptoms such as loss of taste and smell, diarrhoea, and other non-specific symptoms, on the other hand, were not substantially evident in the maternal group.

In line with previous research, our data imply that COVID-19 infection exacerbate pre-existing maternal problems such as pre-eclampsia/eclampsia, pregnancy-induced hypertension, and antepartum haemorrhage.³ We also found that COVID-19 positive moms were more likely to have preterm labour, which resulted in an increase in premature neonates.

Contrary to some of the concerns about the potential influence of COVID-19 on maternal health, our study found that maternal mortality in the COVID-19-infected group was actually slightly lower (8%) than in the non-infected group (9.6%).⁴ However, it is crucial to interpret this finding with caution, since it may be influenced by a variety of factors, including the general low prevalence of COVID-19 in our group, as well as significant changes in disease intensity and therapy.

While our findings imply that COVID-19 infection in prenatal women is not related with an elevated risk of maternal mortality, they do highlight an increase in morbidities such as premature labour. The ramifications of this discovery could be enormous, leading to an increase of premature newborns and the difficulties that come with them. As a result, these data emphasize the importance of carefully managing prenatal patients during the COVID-19 pandemic, particularly those who are elderly or have pre-existing problems.

Our study, however vast and meticulously carried out, has significant limitations. The study is primarily limited to the Maharani Laxmi Bai Medical College in Jhansi, restricting the diversity of the patient group. Furthermore, the study only includes patients who were admitted to the hospital, which may introduce a selection bias because it excludes pregnant women who may have had moderate instances of COVID-19 but were not hospitalized. The reliance on patients being reported to us as COVID-19 positive without necessarily confirming with our own testing could lead to mistakes in infection status. Finally, because the study period was limited to the duration of hospitalization, we cannot account for long-term effects of COVID-19 on mother health and newborn outcomes. Future studies could overcome these limitations by considering a broader range of sites and undertaking longitudinal follow-ups to better understand the long-term effects.

CONCLUSION

The COVID-19 pandemic has significantly strained healthcare systems worldwide, including the sphere of obstetric care. Researching and comparing maternal outcomes between COVID-19 infected and uninfected antenatal patients is a critical and ongoing endeavor. It urges a revision of our policies, particularly with the uncontrolled spread of the pandemic. Our study indicates that different COVID-19 variants influence maternal mortality variably, underscoring the need for continuous monitoring of the pandemic's course. We found that while the pandemic does not significantly impact maternal mortality, the severity and timing of COVID-19 infection during pregnancy are crucial determinants of outcomes. Nonetheless, it's crucial to highlight that available data on COVID-19 in pregnancy are scarce, with most studies

being observational and retrospective, hindering our ability to draw causal relationships between COVID-19 infection and adverse outcomes. Furthermore, numerous independent factors affecting maternal health can also increase the risk of COVID-19 infection. Our research contributes valuable insights into how COVID-19 infection influences maternal outcomes in antenatal patients. It emphasizes the importance of effective antenatal care and COVID-19 management during pregnancy and calls for ongoing research and intervention strategies to alleviate the pandemic's detrimental effects on pregnancy outcomes.

ACKNOWLEDGEMENTS

Authors would like to thank all those who had contributed to the research project, supervisor, and volunteers. They would also like to thank Maharani Laxmi Bai Medical College, Jhansi for supporting this research with resources and infrastructure.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kharakwal S, Sharma A, Mishra PK. Maternal mortality and morbidity amongst antenatal patients with and without COVID-19 infection. Int J Adv Med 2023;10:538-41.